

1997 Chevrolet S10 Pickup
1998-99 DRIVE AXLES Differentials - Eaton Locking - Trucks

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MODEL IDENTIFICATION

Vehicle model can be identified by fifth character of Vehicle Identification Number (VIN), stamped on metal pad on top of left end of instrument panel, near windshield. See **MODEL IDENTIFICATION** table.

MODEL IDENTIFICATION

Series ⁽¹⁾	Model
"C"	2WD Pickup, Sierra, Silverado, Suburban, Tahoe & Yukon
"G"	⁽²⁾ RWD Van
"K"	Escalade, 4WD Pickup, Sierra, Silverado, Suburban, Tahoe & Yukon
"L"	AWD Astro & Safari
"M"	2WD Astro & Safari
"P"	Forward Control & Motorhome
"S"	2WD Blazer, Jimmy, Pickup & Sonoma
"T"	Bravada, Envoy, 4WD Blazer, Jimmy, Pickup & Sonoma
(1) Fifth character of VIN.	
(2) Includes Express, G-Van and Savana.	

DESCRIPTION

This article covers 2 similar locking differentials: those with a 2-piece case (axles with a 10 1/2" ring gear) and those with a 1-piece case (all other axles). The 1-piece case has 2 pinion gears. The 2-piece case has 3-pinion gears. Both types have a clutch disc pack behind each of the side gears.

AXLE RATIO & IDENTIFICATION

Rear axle identification is stamped on forward side of right axle tube. The first 3 digits indicate rear axle ratio, the next digit indicates axle assembly build source code, the next 3 digits indicate the day built in Julian Date form and the last digit identifies the shift build (first or second).

Front axle identification is located on tag attached near axle tube.

REMOVAL & INSTALLATION

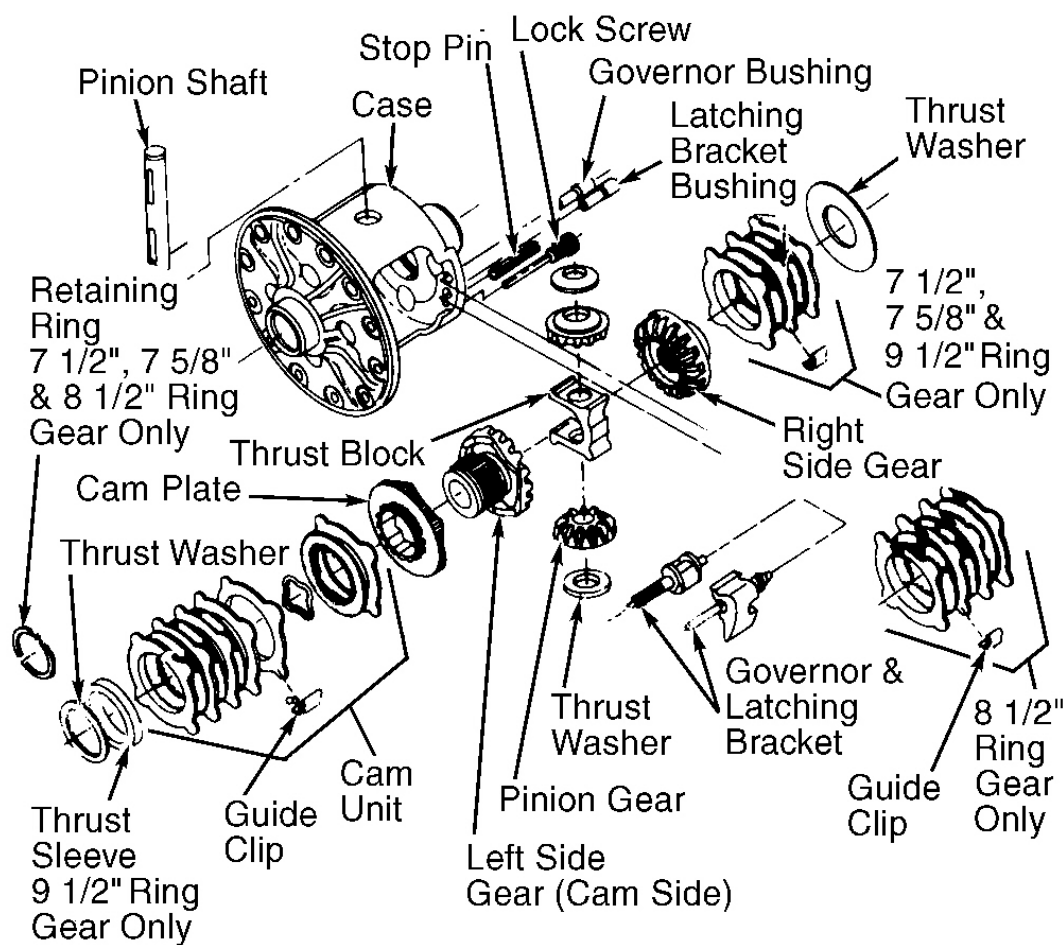
See appropriate article in DRIVE AXLES.

OVERHAUL

1-PIECE CASE

Disassembly (Differential)

1. Using Governor Remover (J-26252), remove governor bushing. Remove "E" clips holding latching bracket in position on governor shaft. Move latching bracket down shaft.
2. Using governor remover, remove latching bracket bushing. See **Fig. 1**. Remove latching bracket, shaft and spring from case. Remove governor. Remove lock screw and pinion shaft. Remove pinion gear and thrust washer. Rotate side gear and roll gears out of case.



G90J13564

Fig. 1: Exploded View Of 1-Piece Case Locking Differential
Courtesy of GENERAL MOTORS CORP.

3. Remove thrust block and right side gear. Remove right clutch plates and side thrust washer. Remove left side gear, cam plate and clutch plates (cam unit) as an assembly. Remove side gear thrust washer.

1997 Chevrolet S10 Pickup

1998-99 DRIVE AXLES Differentials - Eaton Locking - Trucks

Disassembly (Cam Unit)

Remove retaining ring with snap ring pliers. Remove clutch plates, guide clips and wave washer. Remove cam plate and left side gear.

Inspection

NOTE: If side gears or thrust block are replaced, adjust differential. Check side gear backlash and thrust block clearance. See 1-PIECE CASE under ADJUSTMENTS.

Clean all parts in solvent. Inspect all gears for cracks and scoring. Inspect all clutch components and thrust washers for damage. Check fit of side gears on axle shafts. Inspect thrust sleeve for wear. Replace components as necessary.

Reassembly (Cam Unit)

Install cam plate on side gear. Install wave washer. Install clutch plates in alternating sequence (8 on 7 5/8" ring gear and 10 on 8 1/2" ring gear). See Fig. 1 . Install retaining ring. Use grease to hold guide clips in place. Install guide clips on clutch plates.

Reassembly (Differential)

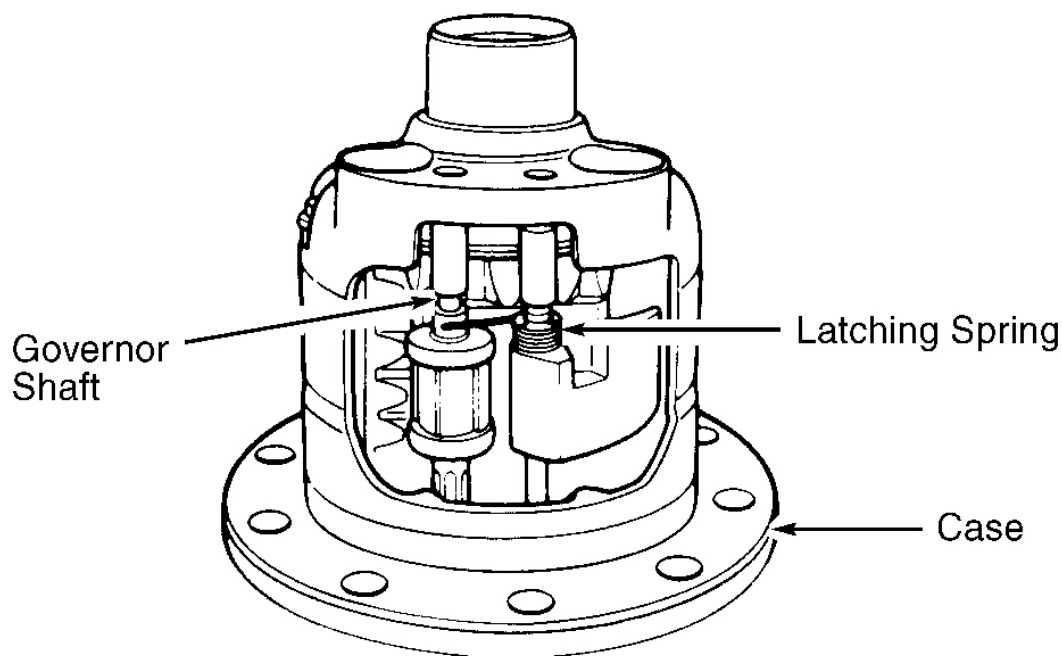
1. Install thrust washer and left side gear (cam unit) in to case. Install thrust washer for right side gear into case. Install clutch pack for right side gear. Install clutch plates in alternating sequence. See Fig. 1 .
2. Use grease to hold guide clips in place. Install guide clips onto clutch plates. Install right side gear, thrust block, thrust washers and pinion gears. Install pinion gears into case, 180 degrees apart.
3. Rotate pinion gears and thrust block into case. Ensure open side of thrust block faces small window opening. Install pinion shaft and NEW lock screw. DO NOT tighten lock screw to specification at this time.

NOTE: Once unit is installed into differential housing, tighten lock screw to specification.

4. Place governor assembly and latching bracket into case. Place straight end of latching bracket spring over and outside governor assembly shaft. See Fig. 2 .
5. Install governor assembly and latching bracket bushing. Latching bracket bushing has a tapered hole; governor bushing has a straight hole. Press governor bushing into case to set shaft end play at .004-.020" (.10-.51 mm). Press latching bracket bushing into case so no shaft end play exists. Once unit is installed, tighten lock screw to 37 ft. lbs. (51 N.m) on 9 1/2" ring gear, or 27 ft. lbs. (37 N.m) on all others.

1997 Chevrolet S10 Pickup

1998-99 DRIVE AXLES Differentials - Eaton Locking - Trucks



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Fig. 2: Installing Governor & Latching Bracket
Courtesy of GENERAL MOTORS CORP.

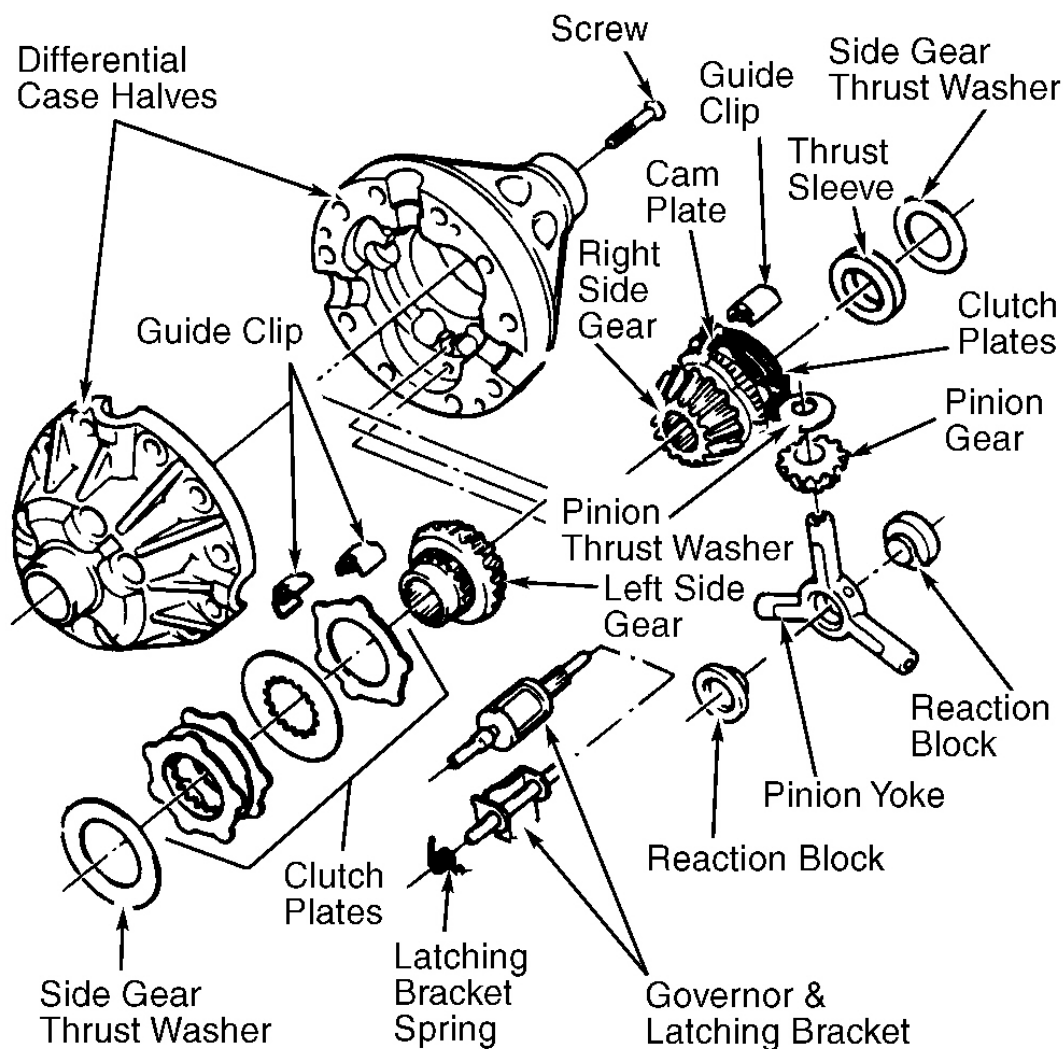
2-PIECE CASE

Disassembly (Differential)

1. With differential removed from housing, remove ring gear and side bearings. Remove screws from front face of ring gear flange. Place differential on right half.
2. Using a screwdriver, gently pry differential case halves apart at yoke hole locations. Remove left half. Hold thumb against inside of gear hub when separating differential case halves to prevent left side gear from falling out.
3. Remove governor and latching bracket assemblies. See **Fig. 3**. Remove left side gear, clutch plates, guide clips and thrust washer. Remove reaction blocks, pinion yoke, pinion gears and pinion thrust washers.

1997 Chevrolet S10 Pickup

1998-99 DRIVE AXLES Differentials - Eaton Locking - Trucks



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Fig. 3: Exploded View Of 2-Piece Case Locking Differential
Courtesy of GENERAL MOTORS CORP.

Disassembly (Cam Unit)

1. Remove right side gear and side gear thrust washer. Measure and record overall length of gear assembly from front of gear to back of thrust sleeve, including side gear thrust washer. See **Fig. 3**.
2. Using press and Bearing Remover (J 22912-01), press thrust sleeve from right side gear. Separate clutch plates, guide clips, wave spring and cam plate from right side gear. See **Fig. 4**.

1997 Chevrolet S10 Pickup

1998-99 DRIVE AXLES Differentials - Eaton Locking - Trucks

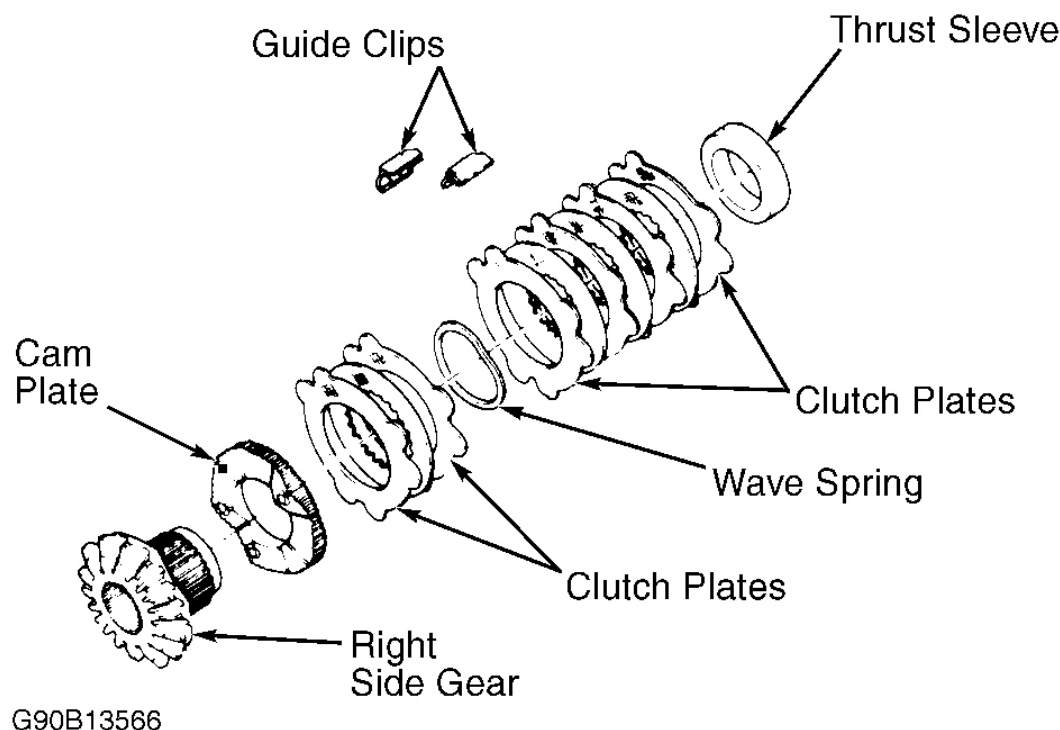


Fig. 4: Exploded View Of Right Side Gear (Cam Unit) & Components
Courtesy of GENERAL MOTORS CORP.

Inspection

NOTE: If side gears or reaction blocks were replaced, adjust differential. Check side gear backlash and reaction block clearance. See 2-PIECE CASE under **ADJUSTMENTS**.

Clean all parts in solvent. Inspect all gears for cracks and scoring. Inspect all clutch components and thrust washers for damage. Check fit of side gears on axle shafts. Inspect thrust sleeve for wear. Replace components as necessary.

Reassembly (Cam Unit)

1. Install cam plate onto right side gear. Install wave spring and clutch plates. Install clutch plates in alternating sequence. See **Fig. 4**.
2. Press thrust sleeve on right side gear until sleeve is even with surface of right side gear disc splines.
3. Use grease to hold guide clips in place. Install guide clips onto clutch plates. If side gear or thrust sleeve were replaced, measure and record overall length of gear assembly from front of gear to back of thrust sleeve, including side gear thrust washer.

1997 Chevrolet S10 Pickup

1998-99 DRIVE AXLES Differentials - Eaton Locking - Trucks

4. Compare new measurement with original measurement taken during disassembly. If difference between measurements is .003" (.07 mm) or more, install NEW side gear thrust washer to obtain reading nearest original measurement.

Reassembly (Differential)

1. Install right thrust washer and right cam unit. Install reaction blocks, reaction block thrust washer, pinion yoke, pinion gears and pinion thrust washers.
2. Install left thrust washer and clutch plates in differential case half. Ensure clutch plates are installed in alternating sequence. See **Fig. 3** . Install left side gear and latching bracket assembly.
3. Install governor assembly. Ensure straight end of latching bracket spring is over and outside governor assembly shaft. See **Fig. 2** . Hold left side gear in differential case half, and install case halves together. Install and tighten retaining bolts. Install ring gear and differential side bearings.

ADJUSTMENTS

1-PIECE CASE

NOTE: If side gears have been replaced, adjust differential. Adjust clearance using correct thickness of selective thrust washers. Left and right side gear backlash must also be adjusted.

Gear Backlash

1. Install cam unit and thrust washer into flange end of case. Install pinion gears and thrust washer into differential. Ensure thrust washers are aligned with pinion shaft hole.
2. Press side gear downward, and install pinion shaft and lock screw. If side gear cannot be pressed down enough to install pinion shaft, install thinner thrust washer.
3. Rotate pinion gear closest to lock screw so one tooth is pointing downward (perpendicular to ring gear flange). Insert a screwdriver firmly between side gear and pinion shaft.
4. Install dial indicator on ring gear flange, with indicator stem positioned on tooth of pinion gear closest to lock screw. Zero dial indicator.
5. Pull pinion gear against case, rotate pinion gear back and forth, and note backlash reading. Repeat procedure on opposite pinion gear. Backlash should be .002-.010" (.05-.25 mm).
6. Change thrust washer thickness to obtain correct backlash. If backlash is greater than specification, use thicker thrust washer. If backlash is less than specification, use thinner thrust washer. Repeat procedure for other side gear.

2-PIECE CASE

NOTE: If cam gear, side gears or reaction block have been replaced, adjust differential clearance. Adjust clearance using correct thickness of selective thrust block and selective side gear thrust washers. Left and right side gear backlash and thrust block clearance must also be adjusted.

1997 Chevrolet S10 Pickup

1998-99 DRIVE AXLES Differentials - Eaton Locking - Trucks

Right Side Gear Backlash

1. Install right side gear (cam unit) and side gear thrust washer into differential case right half. Using washers, long bolt and nut, clamp right side gear unit into differential case.
2. Install pinion gears and thrust washers onto pinion yoke. Install pinion yoke into differential case half. Loosen nut on bolt. Position one pinion gear tooth facing downward (perpendicular to ring gear flange), and tighten nut.
3. Install dial indicator onto ring gear flange, with indicator stem positioned on one tooth of pinion gear. Pull pinion gear against differential case half. Rotate pinion gear back and forth, and note backlash reading.
4. Ensure pinion yoke remains seated while checking backlash. Repeat procedure on remaining pinion gears. Backlash should be .010-.018" (.25-.46 mm).
5. Change thrust washer thickness to obtain correct backlash. If backlash is greater than specification, use thicker thrust washer. If backlash is less than specification, use thinner thrust washer.

Left Side Gear Backlash

1. Assemble clutch plates in alternating sequence. See **Fig. 3**. Use grease to hold guide clips in place, and install guide clips onto clutch plates.
2. Install thrust washer, clutch plates and left side gear into differential case half. Using washers, long bolt and nut, clamp left side gear into differential case.
3. Install pinion gears and thrust washers onto pinion yoke. Install pinion yoke into differential case half. Loosen nut on bolt. Position one pinion gear tooth facing downward (perpendicular to ring gear flange), and tighten nut.
4. Install dial indicator on ring gear flange, with indicator stem positioned on one tooth of pinion gear. Pull pinion gear against differential case. Rotate pinion gear back and forth, and note backlash reading.
5. Ensure pinion yoke remains seated while checking backlash. Repeat procedure on remaining pinion gears. Backlash should be .002-.010" (.05-.25 mm).
6. Change thrust washer thickness to obtain correct backlash. If backlash is greater than specification, use thicker thrust washer. If backlash is less than specification, use thinner thrust washer.

Reaction Block Clearance

1. Install left thrust washer, clutch plates and side gear into differential case. Using washers, long bolt and nut, clamp side gear into differential case. Install right thrust washer and cam pack. Using washers, long bolt and nut, clamp side gear into differential case.
2. Place straightedge across top of both side gears. Using depth micrometer, measure distance from face of straightedge to surface of differential case half. Subtract straightedge thickness from this measurement.
3. Add measurement of both sides together. This is the side gear spread. Assemble both original reaction blocks together and measure thickness of both reaction blocks.
4. Reaction block thickness should be 0-.006" (0-.15 mm) less than side gear spread. To adjust clearance, select reaction block with different thickness, or reshim left or right clutch pack. Ensure side gear backlash remains within specification.

1997 Chevrolet S10 Pickup
1998-99 DRIVE AXLES Differentials - Eaton Locking - Trucks

AXLE ASSEMBLY SPECIFICATIONS

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Application	In. (mm)
Governor Shaft End Play (1-Piece Case)	.004-.020 (.10-.51)
Pinion Gear Backlash	
1-Piece Case	.002-.010 (.05-.25).
2-Piece Case	
Left Side Gear	.002-.010 (.05-.25)
Right Side Gear	.010-.018 (.25-.46)
Reaction Block Clearance (2-Piece Case)	0-.006 (0-.15)

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Pinion Shaft Lock Screw	
7 5/8", 8 1/2" & 8 5/8" Ring Gear	27 (37)
9 1/2" Ring Gear	37 (51)